LIQUID AIR CORPORATION
INDUSTRIAL GASES DIVISION

Material Safety Data Sheet

	PRODUCT NAME [redacted]	
	TELEPHONE (415) 977-6500 **EMERGENCY RESPONSE INFORMATION ON PAGE 2**	
LIQUID AIR CORPORATION INDUSTRIAL GASES DIVISION California Plaza, Suite 350 2121 N. California Blvd. Walnut Creek, California 94596	**TRADE NAME AND SYNONYMS** BlueShield No. 4 or No. 5	**CAS NUMBER** Argon 7440-37-1; Oxygen 7782-44-7
	CHEMICAL NAME AND SYNONYMS Oxygen (O_2) in Argon (Ar) gas mixtures	**NFPA 704 NUMBER (HFR)** 0 0 0
ISSUE DATE REV. JUNE 1, 1986 **AND REVISIONS** CORPORATE SAFETY DEPT.	**FORMULA** O_2/Ar Mixes Various Compositions	**MOLECULAR WEIGHT** BlueShield 4; 5: 39.789; 39.551
		CHEMICAL FAMILY Gas mixture

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT No TWA is established. The gas mixtures are simple asphyxiants. Oxygen levels should be maintained at greater than 18 molar percent at (Continued on last page)

SYMPTOMS OF EXPOSURE

Route of entry is through inhalation. Effects of exposure to high concentrations so as to displace the oxygen in the air necessary for life are headache, dizziness, labored breathing and eventual unconsciousness, and suffocation.

TOXICOLOGICAL PROPERTIES

Mixtures are nontoxic but the liberation of a large amount in a confined area could displace the amount of oxygen in air necessary to support life.

Listed as Carcinogen or Potential Carcinogen	National Toxicology Program	Yes	☐	I.A.R.C. Monographs	Yes	☐	OSHA	Yes ☐
		No	☒		No	☒		No ☒

RECOMMENDED FIRST AID TREATMENT

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO BLUESHIELD NO. 4 OR NO. 5. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

Inhalation: Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen. Medical assistance should be sought immediately.

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	Yes	☐	Yes	☐	Yes	☐
	No	☒	No	☒	No	☒

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HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

None

PHYSICAL DATA

BOILING POINT Argon = −302.55°F (−185.86°C), Oxygen = −297.35°F (−182.97°C)	**LIQUID DENSITY AT BOILING POINT** Argon = 86.95 lb/ft³ (1392.8 kg/m³), Oxygen = 71.23 lb/ft³ (1141 kg/m³)
VAPOR PRESSURE @70°F (21.1°C), above the critical temp. of −188.12°F (−122.29°C) for Argon & −181.433°F (−118.574°C) for Oxygen	**GAS DENSITY AT 70°F 1 atm** BlueShield No. 4 = .1030 lbs/ft³ (1.650 kg/m³); Blue Shield No. 5 = .1024 lbs/ft³ (1.640 kg/m³)
SOLUBILITY IN WATER @68°F (20°C) Bunsen coefficient; Argon = .0340; Oxygen = .0310	**FREEZING POINT** Argon = −308.87°F (−189.37°C); Oxygen = −361.838°F (−218.8°C)
APPEARANCE AND ODOR Colorless, odorless gas; Specific gravity @70°F (Air = 1.0) for BlueShield No. 4 = 1.37; BlueShield No. 5 = 1.37	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED)	**AUTO IGNITION TEMPERATURE**	**FLAMMABLE LIMITS % BY VOLUME**
N/A	N/A	N/A

EXTINGUISHING MEDIA	**ELECTRICAL CLASSIFICATION**
Nonflammable gas mixture	Nonhazardous

SPECIAL FIRE FIGHTING PROCEDURES

N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS

Cylinders contain high pressure gas. If a cylinder is in a fire, cool it and surrounding cylinders with water spray to control rise of internal pressure. Cylinder valve pressure relief device may function to relieve internal pressure.

REACTIVITY DATA

STABILITY		**CONDITIONS TO AVOID**
Unstable		N/A
Stable	X	

INCOMPATIBILITY (Materials to avoid)

None

HAZARDOUS DECOMPOSITION PRODUCTS

None

HAZARDOUS POLYMERIZATION		**CONDITIONS TO AVOID**
May Occur		N/A
Will Not Occur	X	

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in container or container valve, contact the closest Liquid Air Corporation location.

WASTE DISPOSAL METHOD

Do not attempt to dispose of waste or unused quantities. Return in the shipping container *properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place* to Liquid Air Corporation for proper disposal. For emergency disposal, contact the closest Liquid Air Corporation location.

EMERGENCY RESPONSE INFORMATION
IN CASE OF EMERGENCY INVOLVING THIS MATERIAL, CALL DAY OR NIGHT (800) 231-1366
OR CALL CHEMTREC AT (800) 424-9300

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use. See last page.

VENTILATION	LOCAL EXHAUST	SPECIAL
See Local Exhaust on last page.	See last page.	N/A
	MECHANICAL (Gen.)	OTHER
	N/A	N/A

PROTECTIVE GLOVES
As required when welding. See OTHER PROTECTIVE EQUIPMENT.

EYE PROTECTION
Safety goggles or glasses. When welding, wear helmet or use face shield with filter lens. See last page.

OTHER PROTECTIVE EQUIPMENT
Safety shoes and appropriate head and eye protection when welding. See last page.

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION
DOT Shipping Name: Compressed gas, n.o.s. DOT Hazard Class: Nonflammable gas
DOT Shipping Label: Nonflammable gas I.D. No.: UN 1956

SPECIAL HANDLING RECOMMENDATIONS
Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide, drop or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3,000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Keep cylinders away from heat and flame. Do not tamper with (valve) safety device. Close valve after each use and when empty. See NFPA Pamphlet 51A "Welding and Cutting" for additional information.

For additional handling recommendations consult L'Air Liquide's Encyclopedia de Gaz or Compressed Gas Association Pamphlet P-1.

SPECIAL STORAGE RECOMMENDATIONS
Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130°F (54°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.

Do not store or use cylinders in sub-surface or closed (poorly ventilated) areas. BlueShield mixtures No. 4 and 5 are heavier than air and unvented gas could accumulate in low areas and cause suffocation without warning.

For additional storage recommendations consult L'Air Liquide's Encyclopedia de Gaz or Compressed Gas Association Pamphlet P-1.

SPECIAL PACKAGING RECOMMENDATIONS
BlueShield Nos. 4 and 5 are noncorrosive and may be used with any common structural material.

OTHER RECOMMENDATIONS OR PRECAUTIONS
Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).

Always secure cylinders in an upright position before transporting them. *NEVER* transport cylinders in trunks of vehicles, enclosed vans, truck cabs or in passenger compartments. Transport cylinders secured in open flatbed or in open pick-up type vehicles.

Never use the cylinder to strike an arc.

*Various Government agencies (i.e., Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, storage or use of this product which may not be contained herein. The customer or user of this product should be familiar with these regulations.

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INDUSTRIAL GASES DIVISION

ADDITIONAL DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT: (Continued)
normal atmospheric pressure which is equivalent to a partial pressure of 135mm Hg (ACGIH, 1984-85).

RESPIRATORY PROTECTION: (Continued)
When welding in confined space or where local exhaust or ventilation does not keep exposure below welding fume TLV, use positive pressure air line with mask or self-contained breathing apparatus.

LOCAL EXHAUST: (Continued)
To prevent accumulation of high concentrations of gases so as to reduce the oxygen level in the air to less than 18 molar percent. When welding, use enough ventilation, local exhaust at the arc, or both, to keep the welding fumes and gases below the applicable TLVs in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.

EYE PROTECTION: (Continued)
As a general rule, start with a shade which is too dark to see the weld zone. Then go to the next lighter shade which gives sufficient view of the weld zone. Provide protective screens and flash goggles, if necessary, to shield others from ARC RAYS radiation which can injure eyes and burn skin.

OTHER PROTECTIVE EQUIPMENT: (Continued)
When welding, wear head, hand and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z-49.1. At a minimum, this includes welder's gloves and a protective face shield and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

CAUTION: Welding or brazing may produce fumes and gases hazardous to health. Short-term (acute) overexposure to welding fumes may result in discomfort such as: dizziness, nausea, or dryness or irritation of nose, throat, or eyes. Long-term (chronic) overexposure may lead to siderosis (iron deposits in the lung) and is believed by some investigators to affect pulmonary function. ARC RAYS can injure eyes and burn skin. Electric shock can kill. Avoid breathing these fumes and gases. Use adequate ventilation. See ANSI Z-49.1 *"Safety in Welding and Cutting"* published by the American Welding Society.

Consult hazard warnings on boxes or containers (or on tags or labels thereon) containing brazing or welding filler metals, fluxes and fusible granular materials. See OSHA safety regulations under 29 CFR 1910.252 "Welding, cutting and brazing." Also see ACGIH *"TLVs (1985-1986) for Chemical Substances in the Work Environment,"* Appendix B, section B2 *"Welding Fumes"* (Total Particulate TLV-TWA, 5 mg/m^3) for further information.

Consult manufacturer's material safety data sheet on welding consumables and related products for reactivity and health hazard data, and for further information regarding welding fumes.